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State, Competition and Industrial Change in Ireland 1991-1999

SEÁN Ó RIAIN*

National University of Ireland, Maynooth

Abstract: As job losses increased rapidly in 2003 amid calls for increased competitiveness, it becomes all the more crucial to understand the character and causes of such industrial upgrading that did occur in Ireland in the 1990s. This paper argues that despite a continuing reliance on foreign investment, there were significant elements of local industrial upgrading within the Irish economy in the 1990s. Contrary to perspectives which emphasise the learning effects associated with foreign firms, the paper suggests that such upgrading only emerged when and where local and national institutions were established to support relations of innovation and organisational development. The current difficulties in the Irish economy can be traced in significant part to the failure to deepen and extend this emergent system of innovation. The emphasis on 'competitiveness' in contemporary policy debate threatens to undermine the public investment, social relations and collective institution building that have been, and will continue to be, central to industrial upgrading in Ireland.

I INTRODUCTION

As the 'Celtic Tiger' runs into difficulties, it becomes all the more important to understand the precise character of the transformations that occurred in the Irish economy in the 1990s. This paper focuses on industrial change, which was central to the improved growth and employment performance of the Irish economy in the 1990s. How significant was industrial change in Ireland and what factors might explain such transformation that did take place?

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The conventional explanation for the revival in Irish economic fortunes since 1987 emphasises the ongoing commitment to Foreign Direct Investment (FDI) and free trade. Barry (2000) emphasises how a combination of shifting external circumstances and domestic policies facilitated ‘convergence’ with economies in the EU and OECD. Externally, a boom in FDI occurred at the same time as the Single European Market project was being implemented, creating an enormous opportunity for Ireland. Protectionist policies, agricultural supports, low levels of education, prominent state-sector monopolies and pluralist industrial relations inhibited Irish benefits from the market between 1950 and 1988. According to this view, free trade, declining agriculture, rising levels of education, state deregulation and ‘responsible’ central wage bargaining enabled markets to operate more smoothly in the 1990s and stimulated growth. Paul Krugman puts the conventional explanation succinctly: “Thanks in part to luck, in part to policies ..., Ireland got a head start over other European locations in attracting what became a surge of inward FDI; the early investments both generated a cascade through informational effects and, eventually, created external economies that further reinforced Ireland’s advantages” (Krugman, 1998, p. 51; see also Barry, 2000).

Although inspired by dependency theory, O’Hearn’s explanation of Irish growth shares with the orthodox economists the view that the dynamic of industrial growth is driven by FDI, facilitated by a neo-liberal state getting the conditions ‘right’ (O’Hearn, 1998, 2001). The logic is very similar to Krugman’s: “American corporations made major moves to increase their presence in the European market; they tended to agglomerate their new projects to take advantage of the flexibility this allowed; and Ireland was fortunate enough to receive a major share of American-owned electronics projects in Europe because they agglomerated around other major firms such as Intel” (1998, p. 153). FDI generates short-term growth spurts, it will not contribute to the long-term development of the local economy for a wide variety of reasons – the low levels of linkages between TNCs and the local economy, the repatriation of capital and decapitalisation of the local economy, the disarticulation of the local economy between an advanced, foreign dominated sector and a backward indigenous sector (O’Hearn, 2001, p. 193).

Where both dependency and orthodox economic accounts largely discount the role of the state in structuring markets, Cerny (1995) argues that neo-liberal globalisation has seen a greatly increased role for the state as an ‘enterprise association’ which promotes entrepreneurialism and competition. Drawing on Cerny, Kirby (2002, pp. 142-144) argues that the Irish state is best described as a ‘competition state’ which prioritises microeconomic intervention, flexible response to competitive conditions and controlling inflation and enterprise over maximising welfare through expanding the state *vis-à-vis*

the market. For Kirby, while the state is pervasive within the Irish economy, the state-society alliance underpinning what industrial upgrading has taken place is seamlessly integrated with the demands of global competitiveness, creating a 'competition state' (Kirby, 2002, p. 143).

Where Kirby is rightly critical of the desirability of such a delimited role for the state in the economy, the concept of the 'competition state' has been cast more positively by certain important elements within the Irish polity. The National Competitiveness Council closely monitors many aspects of Irish society for their competitiveness implications while An Taoiseach, Bertie Ahern, declared in April 2003: "This government does not believe that market forces alone deliver growth and jobs. We have to be smart. We have to create the conditions in which enterprise can flourish, while international capital flows in to put our people to work in high value, high pay activity.... This is the sort of State that I want to lead". Both the approving and critical accounts of Ireland as a Competition State share a similar logic of explanation of industrial change – an extensive role for the state but one which adheres closely to market principles.

Each of these sets of theories contributes to our understanding of the Celtic Tiger. The points made by dependency analysts regarding the limits of FDI as the basis of a development strategy are well taken. However, as the orthodox economists argue, foreign investment can bring resources which can be mobilised in an economic development strategy. Neither perspective offers a satisfactory understanding of how local institutions and politics shape whether the costs or benefits of FDI are emphasised. Kirby's analysis of the 'competition state' gives a more central role to politics and points up the deeply problematic relationship between growth and inequality in the Irish case. However, by completely subordinating the politics of economic development to the logic of the market, the concept of 'the competition state' unnecessarily narrows our field of inquiry into the social construction of markets and the possibilities for political and economic transformation contained within the institutions that play a critical role in constructing those markets.

This paper develops a 'critical economic sociology' of industrial change in the Celtic Tiger that argues against the fetishisation of market processes within both orthodox and critical explanations. First, I argue that, although Ireland retained substantial elements of an *entrepôt* economy, there was significant upgrading in the 1990s – particularly in the most dynamic and technology intensive sectors. Second, the paper argues against the conventional position of supporters and critics alike that this industrial change can be explained by the greater conformity to 'the market' by the institutions of the Irish economy. A shift in the institutions and state-society relations within which industry in Ireland is embedded – more narrowly put,

a change in the state-led national system of innovation – has been crucial to industrial upgrading and evidence from a variety of studies supports this interpretation of a positive ‘state effect’ on industrial change. Finally, I argue that the ‘competitiveness’ agenda (particularly when focused on attracting FDI) can undermine the very institutions which have been crucial to those genuine gains that have been achieved during the ‘Celtic Tiger’ years. The ‘Celtic Tiger’ does not represent an ‘end point’ of a pre-ordained development path but it is a terrain of political struggle where much remains to play for and where the institutions which provided economic success may themselves be potential tools of social and political transformation.¹

II INDUSTRIAL CHANGE IN THE 1990s: UPGRADING WITHIN THE BUBBLE

FDI has been the bedrock of Irish industrial policy for four decades. Throughout the 1960s FDI grew rapidly with foreign firms accounting for 2.3 per cent of gross output in 1960 but 15.9 per cent in 1973 (O’Malley, 1989, p. 102). The inflow of FDI in the 1960s and 1970s fueled a period of rapid economic growth, although only minimally progressing beyond an ‘export platform’ industrial structure and ultimately underpinning economic disaster in the 1980s (O’Brien, 1986; Murray and Wickham, 1987; Eolas, 1989; Sklair, 1988). Has the FDI boom of the 1990s changed the character of transnational corporations in Ireland?

Foreign Investment: Upgrading Within Entrepôts

O’Hearn (1998) claimed that the deficiencies of FDI in Ireland rendered the Celtic Tiger phenomenon a mirage, an artefact of creative accounting rather than a genuine transformation in societal and organisational capabilities. There is more than a grain of truth to this argument. Honohan, Maitre and Conroy point out that “the Irish manufacturing sector contains ‘invisible entrepôts’ – intangible factors arriving and leaving like cargoes through great transshipment ports” (1998) which are concentrated in the sectors of chemicals, software reproduction, computers and production of cola concentrate. These entrepôts are motivated by a desire to take advantage of the tax benefits of an Irish location in order to retain the highest possible

¹ In this respect, the analysis in this paper has much in common with other perspectives which, despite their diverse evaluations of the Celtic Tiger and its institutions, emphasise the role of the political in shaping development processes (O’Donnell, 2000; Munck, 1999; Ó Riain and O’Connell, 2000).

share of profits on the proceeds of the intellectual work typically carried out closer to the headquarters (usually in the US). These dynamics are further intensified by the transfer pricing activities of US multinationals in Ireland (Stewart, 1989) and by the character of much high technology industry where the costs have increasingly shifted towards the design process (primarily retained in the US) and away from the production process (which is more likely to be located in Ireland). Clearly this activity is significant within the Irish economy. Honohan *et al.* (1998) estimated that over one-third of manufacturing output and approximately 10 per cent of manufacturing employment was accounted for by these sectors.

However, we cannot rely on this phenomenon, significant though it is, to explain Irish industrial growth in the 1990s. First, this activity has been present within the Irish economy since at least the mid-1970s (Honohan *et al.*, 1998; Stewart, 1989; O'Hearn, 1998) and has persisted across slump and boom. Furthermore, focusing on this factor alone cannot explain the relative upgrading of investment, research and development, skills and productivity through the 1990s (see Table 1).

Table 1: *Key Industrial Indicators in the Manufacturing Sector by Nationality of Ownership 1991-1999*

Nationality of ownership	Key Indicators 1999			Percentage Change in Industrial Indicators 1991-1999			
	Total Employ- ment	Output	Labour Costs as % of Output %	R&D %	Employ- ment %	Profes- sional Labour Force %	Output
<i>Irish</i>	125,401	14,152,497	14.7	185.2	15.3	28.1	45.4
<i>United Kingdom</i>	12,660	2,308,864	12.7		-2.6	11.3	62.2
<i>Other EU</i>	23,852	3,111,358	14.9		18.7	49.1	98.7
				<i>All foreign:</i> 141.6			
<i>United States of America</i>	74,781	35,960,866	4.3		91.7	124.0	453.3
<i>Other non-EU</i>	10,826	3,260,475	6.8		-26.6	-1.8	94.4
<i>Total</i>	247, 520	58,794,060	7.8	141.6	26.5	50.4	181.4

Source: Unpublished Census of Industrial Production data, 1991 and 1999, provided by the Central Statistics Office; R&D data from Forfás (1999).

In manufacturing industry, investment flows increased and shifted towards 'intangible' investments such as R&D spending. Manufacturing employment increased over the period and saw a significant degree of 'upskilling', at least as measured by occupational category. 'Administrative and technical' workers (these do not include clerical workers) grew by 50 per cent across manufacturing, almost double the rate of general employment growth. Although output figures are relatively meaningless for the *entrepôt* sectors discussed above, it is striking that output expanded steadily across all nationalities of firms (Table 1) and almost all sectors (as outlined below). There was however a marked sectoral shift with rapid decline in 'older' sectors such as textiles, clothing and leather, even as the 'high tech' sectors expanded rapidly. Furthermore, output per employee grew steadily, within as well as across sectors, indicating an increased level of productivity.

In manufacturing, US owned firms are clearly the primary culprits in pursuing *entrepôt* operations but these firms also had some of the largest increases in investment and made a significant contribution to professionalisation of the labour force. The foreign 'food, drink and tobacco' sector appears to be the only 'pure' *entrepôt* sector with investment and employment falling as output increased. The other sectors – reproduction of recorded media (software design and duplication), chemicals and computers – all saw expansions in investment, R&D and some professionalisation. However, in these *entrepôt* sectors, professional employment expanded only marginally more rapidly than overall employment.

'Other non-EU countries', primarily Japanese companies, were less likely to pursue *entrepôt* operations, had a much greater relative rate of professionalisation within their workforces and made enormous leaps in terms of productivity. This investment is of a 'higher quality' than US investment but these countries have less investment in Ireland and that investment increased less quickly than US investment. Accessing the EU is a major motivation for investment in Ireland as investment from within the EU has been much slower than from non-EU countries. However, investment from non-US firms is more capital-intensive and professional-oriented than the massive inflow of US investment over the past ten years has been.

While there are striking *entrepôt* characteristics to foreign firms in Ireland therefore, there is also evidence of significant industrial upgrading across a wide range of sectors. We see growth almost completely across the board in investment, R&D, employment, professionalisation and productivity. Perhaps the central contradiction of Irish industrial development that has fostered the controversies of recent years is that *entrepôt* activity and industrial upgrading both occurred within the same sectors and even within the same firms. An intriguing aspect of Irish development is the emergence of

local deepening and upgrading from within these non-productive flows of capital.

This picture of relatively widespread industrial upgrading is consistent with national trends in R&D spending and personnel. Gross domestic expenditure on R&D was 0.6 per cent of GDP in 1981, 0.9 per cent in 1990, 1.28 per cent in 1997 and 1.21 per cent in 1999 (failing to keep up with the surge in growth in the late nineties) – although still well below the EU average of 1.8 per cent and the OECD average of 2.2 per cent. Consistent with the labour intensive character of the Irish transformation, Ireland does significantly better in terms of researchers per ten thousand labour force – going from 17 in 1981 to 32 in 1989 to 57 in 1995, passing the EU average of 49 and the OECD average of 55. Among OECD countries, Ireland and Korea show the fastest rates of increase in R&D spending in the 1990s – after respectable average annual growth rates of 6.0 per cent in the 1980s Irish R&D spending increased by an average of 16.7 per cent between 1991 and 1995 and 12.0 per cent between 1995 and 1997. The average rate of increase in the EU from 1995-1997 was 1.9 per cent. Ireland shows by far the fastest rate of increase of researchers – with increases of 7.4 per cent from 1981-1985 and 9.9 per cent from 1985-1989 (above the OECD average of 4.4 per cent). In the 1990s when OECD growth slowed dramatically, the Irish researcher labour force took off – increasing to an average of 10.5 per cent per annum from 1991-1993 and 15.2 per cent from 1993-1996 (figures from OECD, 2000).

There is also evidence of significant transformation of activities within firms. A 1996-1997 survey of a representative sample of enterprises in Ireland, carried out by the Graduate School of Business at University College Dublin, gathered data on a wide range of workplace practices and modes of workplace governance. Roche and Geary (2000) find that, while there has been rapid recent change within Irish workplaces, Ireland is not ‘ahead of’ other industrialised countries nor can the incidence of teamwork be used to explain its growth performance of the past ten years. However, the survey results show that there has been a significant shift towards ‘teamwork’ within firms in Ireland (Geary, 1999; Roche and Geary, 1999). Employee involvement is most developed in the area of quality improvement within teams, less so in the organisation of work activities themselves and least of all in the control of team and organisational boundaries (Geary, 1999, p. 877).

Sectoral Differences in Local Learning

The acid test of industrial development is the development of territorialised, embedded industrial and innovation capabilities. Perhaps one of the most surprising aspects of the Irish growth experience was the growth of indigenous Irish industry in the 1990s. From 1991 to 1999 (and particularly

after 1994) Irish-owned manufacturing industry saw significant rises in investment, R&D, employment, professionalisation and productivity (see Table 1). This would have been inconceivable in the 1980s when employment in indigenous firms was plummeting. Nonetheless, despite these less than promising origins, an indigenous sector emerged. A closer look at the structure of Irish industry confirms that there were important changes alongside the growth in output and employment (see Table 2).

Table 2 combines a number of sectors with similar characteristics together into broader groupings. The first group of sectors falls under the heading of the 'knowledge economy'. These are sectors that are fundamentally based on the processing of information or where, for the most part, indigenous firms spend a similar or greater proportion of their revenues on R&D than the OECD average for their sector (see Forfás, 1999, p. 12).² As well as being the most knowledge intensive sectors, these sectors are the fastest growing, in terms of employment, output and R&D spending.

The sectors include: software, electronic and electrical equipment (including computers and telecommunications), financial services and instruments. Within Irish-owned electronics firms, Ruane and Gorg (2001) show that the 'high skill' sub-sectors have increased their share of total employment from 9.3 per cent between 1982-85 to 33.3 per cent between 1991-1995. Although OECD statistics on R&D are not available for software and financial services, R&D spending per employee clearly indicates that they are among the more knowledge intensive industrial sectors. 'R&D spend per employee' is a useful measure as it gives us a measure of R&D resources from the perspective of employees, providing a sense of how much R&D activity and resources workers might be able to avail of. Given the problems with output figures in the Irish context, this measure gives us a significantly different picture from that provided by 'R&D spend as a percentage of output', which is a better measure of firm's relative commitment to R&D (rather than other investment, wages, profit-taking etc.)

In fact, the industrial statistics mask a more interesting set of relationships among these sectors. Generally, software capabilities have become increasingly important in information and communication technology industries – even in sectors which are ostensibly focused on 'hardware'. The indigenous software industry's major sub-sectors include communications

² Generally, care must be taken with such comparisons across OECD countries as the surveys which form the basis of the figures are often not strictly comparable. Furthermore, given the range of government incentives to increase R&D there is some danger that firms have inflated their R&D spends in these statistics. However, the patterns are clear enough that we can identify basic patterns within Irish industry, particularly given that these patterns reflect case study evidence on the emergence of particular research based firms.

Table 2: *Irish-Owned Industry 1991-1999*

<i>Sector</i>	<i>Key Indicators 1999</i>		<i>Percentage Change in Industrial Indicators 1991-1999</i>			<i>R&D Indicators</i>		
	<i>Output (million pounds)</i>	<i>Employment</i>	<i>Total Employment</i>	<i>Professional Employment</i>	<i>R&D</i>	<i>R&D as % of Output (OECD Averages)</i>	<i>R&D per Employee</i>	<i>R&D per Professional Employee</i>
<i>1. 'Knowledge Economy' (High Growth, R&D Intensity similar to or above OECD Average)</i>								
Software ¹	N/A	16,504	258%	N/A	841%	N/A	5,521	N/A
Other Internationally Traded Services ¹	N/A			N/A	59%	N/A		N/A
Electronics and Electrical Equipment	222.8	4,437	84.7	90.6	570.8	6.3 (5.6)	5,593	29,401
Instruments	31.9	719	245.5	199.1	1030.5	5.9 (7.0)	4,343	15,480
<i>2. Manufacturing/ Sub-Supply</i>								
<i>(a) R&D Intensity low but similar to OECD Average</i>								
Rubber and Plastic	219.3	3,720	68.1	121.7	218.8	1.3 (1.2)	1,045	8,243
Metals, metal products	490.6	9,039	28.7	28.2	79.8	0.7 (0.7)	480	3,957
Machinery and Equipment	236.7	5,302	46.8	60.8	276.7	2.2 (2.1)	1,557	11,496
<i>(b) R&D Intensity low and below OECD Average</i>								
Paper, Print and Publishing (including Recorded Media)	776.9	13,297	23.5	37.9	170.5	0.2 (0.4)	153	931
Pharmaceuticals and Chemicals	455.4	3,305	35.4	18.4	51.7	1.1 (11.5/3.2*)	1,548	7,761
Non-metallic Minerals	461.1	8,194	7.5	26.0	50.2	0.4 (0.8)	437	3,234
<i>3. 'Traditional' Industries</i>								
Food/ Drink/ Tobacco	5,436.3	31,790	8.9	90.6	44.6	0.3 (0.3)	609	4,968
Clothing/Textiles/ Leather	359.7	11,944	-35.0%	83.4	-19.8	0.8 (0.3)	365	3,537
Wood, Furniture	174.0	3,718	20.0	14.9	1034.7	0.9 (0.2)	741	7,820

¹ Export oriented firms only.

Sources: R&D data from Forfás (1999) and special tabulations; employment data for software and international services from Forfás (2000); all other data from special CSO tabulations of Census of Industrial Production data.

*11.5% in Pharmaceuticals and 3.2% in Chemicals.

software (with ties to the telecommunications manufacturing sector), banking and finance software (with ties to financial services) and systems software (with ties to the computing sector) (Ó Riain, 2004). This suggests that something of a high tech ‘cluster’ began to emerge in the 1990s, consisting of overlapping and interconnected sectors and underpinned by growing competencies in software design and production which are being applied across sectors.

The second group of sectors consists primarily of firms involved in general manufacturing and sub-supply. We can divide these into two tiers – a first tier consisting of sectors such as rubber and plastic, metals/metal products, machinery/equipment where R&D spending is close to the OECD average and a second tier of sectors such as chemicals and pharmaceuticals, non-metallic minerals and paper, print and publishing where R&D is significantly below OECD levels. These sectors are growing modestly but steadily. Overall, the most sophisticated sectors of Irish manufacturing and internationally traded services have been growing fastest in terms of employment, professional employment and R&D spending.

Finally, we find a mixed picture in the ‘traditional’ sectors. The food sector is large, forming the only ‘cluster’ within indigenous industry large enough to show up in trade statistics (O’Malley *et al.*, 2000).³ It grew steadily but modestly with R&D levels close to the OECD average. Clothing and Textiles collapsed while Wood and Furniture increased employment and grew in sophistication (see Jacobson and Mottiar (1999) for an analysis of this sector).⁴

We can use these insights into the indigenous sector to cast some light on the foreign owned sector, where it is extremely difficult to assess the sophistication of firms’ activities, given the distortion of output figures by entrepôt activities. Conventional measures of R&D spending as a percentage of output do not give a true measure therefore of the level of resources expended on R&D within firms. A better measure of the R&D resources which employees can draw on within the firm is the R&D spend per employee which is between £4,343 and £5,521 for these leading sectors (see Table 2). Table 3 presents an overview of the foreign owned sector, organised similarly to Table 2 for comparison purposes.

R&D is a tiny proportion of output in almost every sector among foreign owned firms. Clearly, the revenues generated in Ireland by foreign firms are not being re-invested in developing local capabilities – Ireland has failed to capture the rewards of these enormous revenues (many of which are of course

³ Although the knowledge economy cluster noted above might also be significant if more informative industrial and trade categories were available.

⁴ The transport equipment sector has been omitted from the table as statistics were not available by nationality of ownership.

Table 3: *Foreign-Owned Industry 1991-1999*

<i>Sector</i>	<i>Key Indicators 1999</i>		<i>Percentage Change in Industrial Indicators 1991-1999</i>			<i>R&D Indicators</i>		
	<i>Output (million pounds)</i>	<i>Employment</i>	<i>Total Employment</i>	<i>Professional Employment</i>	<i>R&D</i>	<i>R&D as % of Output (OECD Averages)</i>	<i>R&D per Employee</i>	<i>R&D per Professional Employee</i>
<i>1. Knowledge Economy' (High Growth, R&D Intensity similar to or above OECD Average)</i>								
Software ¹	N/A	33,973	404%	N/A	681%	N/A	1,794	N/A
Other Internationally Traded Services ¹	N/A			N/a	914%	N/A		N/A
Electronics and Electrical Equipment	2,967.6	18,706	111.7	137.3	281.6	1.3 (5.6)	5,130	25,808
Instruments	625.6	8,550	65.1	124.9	315.6	1.2 (7.0)	1,406	7,957
<i>2. Manufacturing /Sub-Supply</i>								
<i>(a) R&D Intensity low but similar to OECD Average</i>								
Rubber and Plastic	295.9	4,359	-2.1	13.4	352.8	0.7 (1.2)	664	7,810
Metals, metal products	378.1	3,634	4.8	12.4	48.0	0.3 (0.7)	393	4,133
Machinery and Equipment	494.8	6,998	-5.5	8.1	93.3	0.8 (2.1)	857	7,288
<i>(b) R&D Intensity low and below OECD Average</i>								
Paper, Print and Publishing (including Recorded Media)	867.6	3,336	126.6	116.4	-34.3	0.01(0.4)	52	222
Pharmaceuticals and Chemicals	2,229.8	11,343	62.8	77.3	164.8	0.5(11.5/3.2*)	4,168	16,050
Non-metallic Minerals	120.9	1,848	-16.5	-34.4	256.7	0.9(0.8)	1,071	9,137
<i>3. 'Traditional' Industries</i>								
Food/Drink/Tobacco	2,370.6	12,683	-0.8	1.2	196.1	0.3(0.3)	1,083	6,991
Clothing/Textiles/ Leather	595.7	15,539	-47.9	-33.2	-19.7	0.1(0.3)	58	695
Wood, Furniture	56.0	480	127.9	232.3	7,775	0.7(0.2)	1,079	11,469

¹ Export oriented firms only.

Sources: R&D data from Forfás (1999) and special tabulations; employment data for software and international services from Forfás (2000); all other data from special CSO tabulations of Census of Industrial Production data.

based on transfer pricing and entrepôt activities). However, R&D spend per employee presents a more complex picture. Irish industry remains a better bet in most sectors in providing employees with access to R&D funds. The gap is particularly striking in software and instruments where a high tech image is associated with decidedly low tech R&D levels among foreign firms. On the other hand, foreign firms' R&D spend in electronics and electrical equipment is similar to indigenous firms (which spend over the OECD average), and workers in foreign owned chemicals and pharmaceuticals plants have similarly high levels of R&D funding available to them.

Roche and Geary's research regarding the diffusion of teamwork also support a view similar to that in the industrial statistics – a significant upgrading of organisational capacities across a range of sectors with the most intensive upgrading concentrated in high tech and internationally traded services sectors. Teamwork is most firmly established in firms in financial services or high tech sectors and where product customisation is a critical competitive aspect of the firm's business and, perhaps surprisingly, teamwork has spread most widely among Irish owned firms (Geary, 1999; Roche and Geary, 2000).

It is clear that a transformation took place in the 1990s that is significant in terms of output, employment and R&D and organisational change. Understanding the causes of these changes is crucial to the consideration of policy responses to current job losses across a wide range of sectors.

III EXPLAINING UPGRADING: INSTITUTIONS OF INNOVATION

The analysis above suggests that foreign firms often have greater R&D spending and more highly professionalised workforces than indigenous firms. Many commentators have argued that foreign firms have been the major contributor to learning and productivity improvement in Irish industry. Notoriously disconnected from the surrounding economy, TNCs increased their local purchasing of goods and services in the 1990s – even if in many cases this was from other TNCs located in Ireland. In 1998, foreign-owned manufacturing firms' purchases of raw materials and services in Ireland expenditures in the Irish economy came to 21.2 per cent of their sales, compared to 55.0 per cent for Irish-owned manufacturing firms. Although still predominantly organising themselves through global production networks, TNCs were increasingly likely to purchase locally as purchases of raw materials in Ireland as a percentage of total purchases of raw materials rose from 13.2 per cent in 1988 to 22.8 per cent in 1998 among electronics firms and from 15.4 per cent to 21.0 per cent for all foreign non-food manufacturing firms

(Forfás, 1999). Furthermore, indigenous industry growth has occurred in many of the same sectors as FDI and indigenous firm entry into manufacturing sectors has been found to have been encouraged both by the 'linkage' effects of ties to foreign companies in those sectors and by the presence of foreign companies as 'markets' in other sectors (Gorg and Strobl, 2002).

The Limits of the Foreign Investment Explanation

However, attributing local learning predominantly to the presence of TNCs exaggerates their impact. Analyses of Ireland's growth performance find that there are significant elements of learning and productivity improvement that contributed to Irish economic growth in the 1990s, and which cannot be explained by investment or improved education levels (De La Fuente and Vives, 1997, p. 117; O'Leary, 2000; Durkan *et al.*, 1999). It is striking that the Irish case depends heavily on the contribution of labour and on a steadily increasing unexplained 'productivity' of these flows of capital and labour. Unlike the 'Asian Tiger' economies, high rates of investment do not play a critical role in Irish growth. The Irish success story is not one driven by a logic of capital investment but an increasing contribution of the labour force and a rising productivity.

Furthermore, this cannot explain the emergence of Irish firms as exporters in their own right, relatively independent of the TNCs where many of their founders had gathered work experience. These entrepreneurs rarely founded firms in directly comparable lines of business to the firms where they had gained their experience – most TNCs offered experience in production and areas that were of limited relevance to many of the technology development oriented firms that have emerged in the 1990s (Ó Riain, 1997). Foreign companies have only rarely been involved in any significant technology transfer, joint venture or licensing relationships with indigenous firms. Breathnach and Kelly (1999) find that firms which sub-contract with TNCs in Ireland are slightly *less* likely to carry out R&D. Although 37 per cent of R&D performing foreign firms were involved in research partnerships with higher education institutions in Ireland, many of these connections involved relatively routine contract research and only 17 per cent were involved in partnerships with other firms (foreign or indigenous) in Ireland (Forfás, 1999, p. 21). Similarly, foreign firms have had few investment relationships with indigenous firms. Once again, foreign firms provide resources in the form of sub-contracting, sales and career opportunities but these are provided at a relatively low level of sophistication and cannot of themselves generate the social and organisational institutions that might make it possible to take advantage of them.

Comparing R&D spend per employee in Irish and foreign firms (Tables 2 and 3) shows that there is much to be explained in terms of the relation between foreign and indigenous firms. There are sectors where employees in both foreign and indigenous firms have seen growth to relatively high levels of R&D spend per employee (electronics, wood/furniture) – supporting some form of linkages argument. However, there are other sectors such as software and instruments where the indigenous firms are much more sophisticated than foreign firms – with much higher levels of R&D spend per employee and more rapid growth in R&D. Finally, foreign firms in chemicals and pharmaceuticals have relatively high levels of R&D spend per employee but this has not generated employment or R&D growth among indigenous firms.

Institutions of Innovation: The Crucial Mediating Factor

Clearly, there are connections between TNCs and local upgrading – but these must be explained rather than simply assumed. The issue of the local capacity to absorb knowledge and engage in learning relationships is central to understanding industrial change in Ireland and cannot be simply reduced to the education levels of the labour force, given the mass emigration and over-qualification of Irish graduates in the 1980s and 1990s. To understand why Ireland could ‘under-perform’ with FDI in the 1980s while ‘over-performing’ in the 1990s we need to understand the changing social and institutional context of business development, learning and innovation in Ireland over this period.

Although commentators often recognise in passing the contribution of state industrial development policy to the turnaround of the 1990s, little attention has been paid to the institutional system of innovation within which firms in Ireland were embedded. Economists assume that the presence of grants is itself an indicator of rent-seeking behaviour rather than exploring the conditions under which state supports lead to rent seeking and when they generate improvements in performance (Barrett, 1997; Barry, 2000; O’Leary, 2000). For example, economists often emphasise the ‘environment’ for entrepreneurship, assuming that entrepreneurship is simply formed through individual initiative. As we shall see however, entrepreneurship was profoundly shaped and promoted by a dense network of public and semi-public institutions. Furthermore, they also argue for ‘selection effects’ where the ‘shake-out’ of Irish industry left only the strongest firms standing, once more justifying the claim of the market for the credit for the Irish miracle. Unfortunately for the market however, the most innovative segments of the revived indigenous industry are dominated by new firms, often in sectors such as software and data communications that barely existed in the mid-1980s.

Before the industrial revival of recent years Irish industry had a very weak presence in the traded sectors of the economy and in some respects it

could be said that no coherent policy regime existed to support potential firms which might emerge in these traded sectors. Nonetheless, in certain sectors, state agencies played a key role in promoting R&D, business development and the growth of indigenous firms in the 1990s. A certain amount of political space emerged in the crisis of the 1980s for new institutional projects and state-society alliances. A little recognised but highly significant alliance between science and technology-oriented state agencies, technical professionals and university constituencies emerged which supported the deepening of technical capabilities and collective learning across the Irish economy. This process was underpinned by the state as state agencies, through their participation in this alliance, defined general priorities, provided finance and institutional supports and legitimated this agenda. These state agencies played a central role in upgrading industry and deepening Ireland's production and innovation capabilities in the 1990s, and were themselves rewarded with a greater legitimation of their own position within the state system – although they were never able to overcome the dominance of the IDA-led emphasis on foreign investment. The emergence of this alliance, embedded in both the global and the local and mobilising resources from each, is the decisive feature which explains the transformation in Irish technological and organisational capabilities in the 1990s (Ó Riain, 2004).

Elements of the state had already played a central part in transforming the education system leading to a reasonable supply of skilled labour. Furthermore, a reserve of emigrant professionals waited for opportunities to return, doing so in large numbers from the mid-1990s. In the years around and after the Telesis report, the state began to pursue a wider range of industrial development strategies. New sectors had been added to the list of target sectors – most important of which were software and financial services. State agencies also acted to support emerging indigenous industry and to upgrade the national system of innovation in three major ways (Ó Riain, 2000). By defining the character of industrial strategies, implementing company development through grant aid and creating an associational infrastructure for innovation, the state has been able to contribute handsomely in the 1990s to the development of indigenous industry and the upgrading of the national system of innovation more generally.

First, it acted to define the types of involvement in the international economy which would be supported. The IDA provided valuable investment and other support in particular sub-supply sectors, such as software manual printing (Jacobson and O'Sullivan, 1994) and electronics. More importantly, state agencies emphasised technology-related exporting in their support of indigenous firms. In industries such as software design, the state development

agencies focused grant aid almost completely on companies producing software products for export – attempting to steer companies away from the ‘easy’ profits of labour contracting. The state acted in important ways therefore to define the character of Irish industry, without attempting to define the specific strategies to be followed by firms.

However, the state has also made more direct contributions. Its second contribution was to ‘making winners’. Private capital was not a major factor in the growth of Irish industry and it is only since 1998 that private investment capital, from both domestic and foreign sources, has become abundant even in leading sectors such as software. The state was therefore the major provider of external capital to indigenous industry. Furthermore, this more direct involvement of the state was significantly more effective in promoting productive investment than previous schemes aimed at providing business expansion funds for start-ups. These schemes, with less state agency oversight, became more politicised and degenerated into subsidies for well-established firms or into a peculiarly effective means of avoiding tax (see Stewart, 1992).

The importance of the state in providing financing and in stimulating private investment is indicated in Table 4 which provides data on private equity investments between 1997 and 1999, the period when private, increasingly international, investment surged in Ireland. These investments are concentrated in computer related sectors, electronics, ‘other manufacturing’ and (in 1999) communications. The Irish share of European private equity investment increased from 0.3 per cent in 1995 to 0.8 per cent in 1998 and 1.2 per cent in 1999.

In 1997 all investment was from domestic sources and one-third of that was from the state. A significant portion of the remaining investment would have been stimulated by the state through ‘matching funds’ arrangements – perhaps up to an additional 25 per cent. In 1998 there is a sharp increase in investment as domestic investment increases but, more importantly, international investors flood into the increasingly successful Irish economy. The primary source of funds was now private individuals as institutions such as pension funds, banks and insurance funds lag behind. In 1999 – well into the boom years – institutional investors took the lead in investment funds. Non-European sources accounted for fully one-third of funds in 1999, up from a quarter in 1998.

By 1999 Ireland was well integrated into international institutional investment circles and the state began to withdraw from its previously dominant role as a source of funds. However, individual and institutional investors largely followed rather than led the growth of the high tech

industries in which most of this funding was concentrated. Although these investors began to provide the large amounts of funding required by the most prominent companies, they only did so once the growth potential of the software industry and other high tech sectors had been clearly demonstrated. Ironically, the risk taker here is the state, which was the primary source of funding throughout the important period of initial growth and consolidation.

Table 4: *Trends in Private Equity Investment 1997–1999 (000s of Irish pounds)*

	1997	1998	1999
Total Funds	27,713	163,626	316,232
Total State Funds	10,048	20,775	12,151
<i>Selected Major Types of Investors</i>	%	%	%
Government	36.3	12.7	3.8
Private Individuals	13.7	26.2	21.7
Banks	17.1	3.7	25.0
Pension Funds	7.3	8.2	26.8
<i>Geographic Breakdown of Private Equity Raised</i>			
% Domestic	100	44.7	42.8
% Other European	0	35.7	19.6
% Other Non-European	0	25.2	32.0

Source: European Venture Capital Association, Annual Reports.

Furthermore, state agencies promoted a general company development programme through their grant giving practices in a variety of areas including marketing, management development, training and R&D. Grant giving became more selective, as recommended by the Culliton Report (1992), and state agencies 'seeded' venture capital funds. The precise form this took was quite flexible depending on the company itself but the state agencies required that such efforts at company development take place. Some IDA executives had even been involved in company development in the 1980s before the policy shift had found its way into official policy.

Third, the state played a critical role in the creation of a network of industry and trade associations, universities, innovation and technology centres and other fora and groups which provide an associational infrastructure for information-sharing, cooperation and innovation. While these bodies are outside the state or semi-autonomous from it, in most cases they have been founded through state initiatives and underwritten by state

guarantees and funding. Nonetheless, they form a distinct layer of institutional spaces and social networks between the state agencies and the companies in the industry. A diffuse state influence throughout the industry is built into the organisational structure of the institutions. These institutions are typically located within the universities; staffed by academics and industry people; usually have advisory boards containing industry, academic and state representatives; and have extensive ties to industry through consulting, information days and other activities undertaken at least partly for funding purposes. In many ways these associations and networks perform some of the integrative functions carried out within the corporation in vertically integrated, large firms.

Assessing the Effect of Institutional Supports

There is significant a priori evidence that state supports have made a difference. Agriculture remains perhaps the primary 'cluster' within the Irish economy (O'Malley and Van Egeraat, 2000) and agricultural upgrading has been underpinned by the emergence of significant basic and industrial research capabilities within the universities and Teagasc. Stagnant since the 1960s, Irish tourism enjoyed the highest rates of growth in the OECD since 1986 and saw a significant upgrading in its 'product' as well as enjoying greater international demand (Barrett, 1997). Barrett provides data that suggests that public subsidy accounted for approximately 30 per cent of the rapidly increasing investment in tourism, while the private sector accounted for around 22 per cent. While he comments on the rent-seeking opportunities generated by this funding, it seems much more likely that state support has enabled this rapid expansion by providing valuable funds for 'kick starting' small and medium sized tourism oriented commercial operations, as well as improving infrastructure.

In manufacturing, O'Malley *et al.* (1992) find that in the 1980s "both new and already existing grant-assisted industries have made a substantial positive contribution to employment, and that existing grant-assisted industry has had a substantially better employment record than corresponding non-assisted firms" (1992, p. 89). Furthermore, they find that grant-assisted firms' employment performance improved significantly faster than non-grant-assisted firms and that this could not be explained by a one-time boost given by the grant funding. They conclude that their analysis "suggests that the grants were not only awarded more selectively by means of refraining from aiding weaker firms, but that they were also awarded to the stronger firms with good growth prospects in a manner or in a context which raised the average performance of such firms in succeeding cohorts of grant recipients ... it is clear in the circumstances that job creation in relation to state

expenditure must have improved considerably since 1984" (O'Malley *et al.*, 1992, pp. 97-98).

Research in the software industry in the 1990s shows that indigenous firms that received greater amounts of grant aid employed more staff, were more likely to focus on products rather than services, more likely to export and more likely to be involved in international technology and business alliances (as well as less likely to be involved in subcontracting relationships) (Ó Riain, 2004). The statistical evidence regarding the positive effect of grant aid on Irish software firms is supported by the statements of the firms themselves (O'Gorman *et al.*, 1997). While many firms complained about the administrative demands of filling out grant applications analysis of grant-aided and non-grant aided firms shows that through the early 1990s at least grant aided firms significantly outperformed non grant aided firms – both in the software industry (Clarke, 1995) and in the economy as a whole (O'Malley, 1992; O'Malley, Kennedy and O'Donnell, 1992).

Although it is notoriously difficult to assess the effects of such institutions on firms, a series of public and quasi-public evaluations have returned largely positive assessments of various institutions and programmes – both by international expert panels and by firms themselves. There is also evidence that those software firms that rely most on universities as a source of innovation are likely to produce products for export and to be engaged in international technology alliances – suggesting that international technological sophistication is embedded in local institutions (Ó Riain, 2004).

There is strong evidence then that shifting state strategies have had a substantial impact on firm performance. These strategies, embedded in the social relations and practices of this 'indigenous innovation' alliance, have contributed handsomely to making the connections between the TNC economy and local upgrading.⁵ In the absence of this alliance, and its institutions and practices, it is difficult to see how the Irish economy would have broken – to even the extent it did – out of its vicious cycle of a 'hollowing out' of local capacity by footloose capital and mass emigration. In each of the three broad ways in which the state shaped the forms of market participation of firms, its actions shaped social relations and the characteristics of socio-economic actors such as firms. The upgrading that occurred took place as some of the elements

⁵ One reason why an indigenous chemicals and pharmaceuticals industry has not emerged in a similar fashion to the IT cluster is that the particular mode of Irish state intervention is not based on mobilising large amounts of capital for science-based firms but on distributing relatively small amounts of capital linked to employment – a model which has been used effectively by software firms. The Science Foundation Ireland model of research funding does appear to be based on the former approach, although it has to date remained dangerously isolated from the existing system of innovation and indigenous firms.

of a 'national system of innovation' were still being developed – significant research and investment funding only emerged *after* growth and industrial learning were well under way (see Hobday, 1995 for a similar point regarding industrial upgrading in the East Asian 'Tigers'). State supported, socially embedded relationships of technological and organisational learning were critical to not only generating economic growth but also to creating the coalitions which built political support for these new economic relations and institutions.

IV A CONTRADICTION ALLIANCE: SOCIAL INSTITUTIONS AND MARKET COMPETITION

As economic growth has slowed and industrial employment declined in 2002 and 2003, policy debates in Ireland have focused heavily on competitiveness. The consistent policy focus of the National Competitiveness Council has been the restriction of public spending (particularly on social services) and the containment of wage growth, among other components of cost competitiveness. However, this response to industrial difficulties is based on a misreading of the character and causes of industrial development in the 1990s. The low corporate tax regime, the declining share of public spending in GDP and the focus on foreign investment can help explain the entrepôt economy and the surge in employment in foreign firms. However, it cannot explain the elements of industrial upgrading in the 1990s, such as increasing levels of exporting, R&D and professionalisation.

There is no doubt that 'competitiveness' has become central to the activities of the Irish state. Assuring a 'competitive business environment' has been a central policy goal, 'competitiveness' has become a taken-for-granted desirable value in public discourse and institutions such as the National Competitiveness Council have been created to enforce the competitiveness discourse in socio-economic practice. Although Kirby (2002) does not provide a sustained empirical analysis of Ireland as a 'competition state', Ireland clearly conforms to many aspects of the model.

But the language of competitiveness obscures the roots of industrial upgrading in a complex of public investment, social institutions and a network of political and economic supports. There are other respects in which the Irish experience is incompletely described by the 'competition state' model and addressing these areas opens up important areas of political strategy and action.

First, the notion of a competition state does not capture how the logic of state agencies and social institutions differed from a purely market calculus

and, therefore, it unnecessarily narrows our understanding of the institutions underpinning economic growth. The national system of innovation is better understood as a state and social embedding of market action, not as an institution which is completely subservient to market competitiveness. Official responses to job losses in Irish industry have largely taken the form of rote calls for restored competitiveness when the roots of these difficulties are in an industrial system where the system of innovation is concentrated on a small range of sectors and where its institutions continue to have to battle for resources within a system focused on the needs of foreign firms.

Second, the notion of a 'competition state' fails to recognise the internally contradictory nature of "market liberalism" itself. In fact, as Polanyi (1944) and more recently Granovetter (1985) argued, market relations are simply unsustainable without some form of social embedding. Therefore, a strategy of the creation of a disembedded market society, along the lines of the neo-liberal political project, inevitably sows the seeds of its own destruction – albeit creating enormous casualties along the way. Far from being smoothly integrated with market competitiveness, the institutions of the system of innovation in fact need to be protected from excessive marketisation of the institutions of the economy and particularly from the growing financialisation of its firms and institutions (Lundvall *et al.*, 2002). The 'short-termism' of financial markets and 'flexible firms' often only serves to undermine the ongoing social relations of cooperative learning and investment in competence building which are critical to innovation in a knowledge economy.

Similarly, attempts to make innovation-supporting institutions commercially viable have been largely disastrous. For example, perhaps the primary reason for the collapse of the National Software Centre in the 1980s was the conflict generated by the demands put on it to undertake a mission of 'upgrading' the industry, while at the same time requiring it to be commercially viable. Caught between devolving into a development services organisation or competing with the major firms in the industry, the Centre lost industry support and was ultimately closed (Ó Riain, 2004). The Programme for Advanced Technology (PAT) centres have also suffered at times under pressures to be self-funding. One such centre was the Centre for Software Engineering, widely recognised as an important part of the software industry's institutional support system, but which has been seriously damaged by recent cutbacks in third level funding. More generally, the decline in public spending as a percentage of GDP has manifested itself in the practical halting of third level research funding, the increasingly mass character of third level education and the crisis in primary school facilities and access. The 'competitiveness' agenda undermines the investment and collective institution building which is crucial to industrial upgrading. If 'laissez-faire was planned'

(Polanyi, 1944) then laissez-faire also attacks the very planning which sustains productive activity and ultimately the market itself.

Finally, this more complex, contradictory perspective on the global and Irish political economies is not simply a quest for complexity for its own sake. To simply describe the institutions of a 'national system of innovation' (NSI) as oriented toward competitiveness ignores the many political possibilities that the institutions of economic development present for future transformation. The NSI can be undermined by neo-liberal strategies or it can be part of the economic basis of a move toward the social democracy – indeed the concept of the NSI, in its broad form as the social embedding of innovation activity, was developed as a way to understand the economy which underpinned Scandinavian social democracy (Lundvall *et al.*, 2002; Mjoset, 1992). Rather than reducing the complexities of institutions and politics in capitalist development under globalisation to 'competition', we need to provide better understanding of the effects and possibilities of institutions such as those of the NSI as well as other critical institutional realms as industrial relations, social partnership and the welfare state. A crucial part of this understanding and politics will of course be the tracing of the concrete forms of influence and power of transnational capital within these institutions and in industrial politics.

V CONCLUSIONS AND IMPLICATIONS

This paper has argued that a significant transformation and upgrading occurred in Irish industry over the 1990s, albeit within a 'bubble' of entrepôt FDI; that this upgrading was promoted primarily by a state-society alliance which developed new institutions of a system of innovation where the national level integrates local, national and global elements; and that this alliance should be seen as existing in a tense and contradictory relationship to the institutions of the market, not as simply subservient to market competitiveness.

The analysis of industrial upgrading shows that the link between FDI and local learning and industrial upgrading is a contingent one. FDI is less likely than indigenous industry to generate a local dynamic of industrial transformation – and it is not likely to prompt indigenous firms into upgrading without a further local coalition that mobilises to that end. Local institutions are critical in strategically building upon FDI and in supporting the development of a new 'logic' of industrialisation within the economy. Perhaps the major challenge that FDI poses to such a project of indigenous development is that it tends to undermine the very institutions that are

necessary to promote indigenous growth, by shaping the organisations of the state such that they are focused on FDI and free trade rather than indigenous innovation and local capabilities. However, such an effect is not inevitable if a political coalition can mobilise against it.

Furthermore, the analysis implies that state and social embedding of economic relations and the development of institutions which can shape market relations are crucial to economic development. If tax concessions and other measures attracted a disproportionate share of FDI to Ireland, it was local non-market institutions, and crucially state aids, that supported the industrial upgrading around them. This is a particularly crucial lesson, given that the Irish experience of attracting disproportionate amounts of FDI, by definition, cannot be replicated across a wide range of economies. It also follows that *low* corporate tax in itself is not necessarily desirable for economic development, as it was the role of *lower* Irish tax in attracting disproportionate amounts of FDI which was critical. Low corporate tax in and of itself has not been critical to growth and development. Once again, this is a strategy that cannot be 'exported' indefinitely as there can only be a limited number of 'winners' in such a game – and the implications internationally for tax revenues are disastrous. Neither should we make a fetish of low personal income tax rates – a dynamic economy supported by a rich national system of innovation is compatible with much higher rates of tax than in Ireland (e.g. Finland). Indeed, if low tax rates damage investment in labour and institutions, they will undermine economic development. The most valuable comparative lesson of the Irish experience is the continuing importance of state intervention and state-society embedding of market relations, even in a context of globalisation and regionalisation. State aids were a critical instrument of policy – not for 'propping up' indigenous firms but for promoting learning and inducing and supporting upgrading. Given this, the EU attack on state aids is short-sighted and promises to undermine the possibilities for the new EU members to 'catch up' effectively.

Finally, the understanding of Irish industry provided here suggests some possibilities regarding tackling inequality and exclusion in the Irish political economy. Since the most dynamic firms in the Irish economy are embedded in networks of public and semi-public institutions, there are a variety of possibilities for using such institutions to tackle social exclusion. Linking active labour market policy more closely to the national system of innovation would give communities and state agencies more leverage to negotiate firm participation in training and labour market access programmes. Unions will need to explore new strategies and issues for organising the most dynamic new sectors (see Benner, 2002 for interesting examples from the US). The regular 'skill shortages' experienced by 'high tech' sectors offer regular opportunities

for state and social actors to bargain with firms to promote measures to tackle social exclusion through the institutions of social partnership and the system of innovation.

All of this too is underpinned by a moral politics (Lakoff, 1996; Block, 2002). The critics of the 'Celtic Tiger' have rightly pointed to the missed opportunities to tackle inequality and exclusion, but have yielded the story of 'economic success' to the market and have been left without a basis for arguing for the responsibility and accountability of those groups that have experienced enormous success in the market in the 1990s. The analysis presented here implies a very different moral story to be told about the Celtic Tiger than that offered by stories focused on the market. The 'Celtic Tiger' is not a product of heroic entrepreneurs in the market but is a (partial) success made possible by the embeddedness of entrepreneurs and workers in dense social institutions. There is a significant collective contribution to the success of those who have benefited 'from the market' and those social groups are therefore subject to legitimate claims from those collective institutions. Society's claim on the technical-professional classes and entrepreneurs who have benefited most from the 'Celtic Tiger' is not one of guilt or charity, but one of right, as the success of these firms and social classes rests heavily on collective social and state institutions.⁶

Recognising the importance of state and social embedding of economic action not only makes for better economic policy but also opens up new political possibilities within the Irish political economy. The state still matters because (to use Cerny's, 1995 terms) it is *both* a civic association, an arena for advancing legitimate political claims, *and* an enterprise association, promoting economic development. Understanding that market actions and outcomes are deeply embedded in institutions of state and society provides not only an account of institutions which can shape growth, development and equality but also the starting point for a moral politics of the 'Celtic Tiger' which can provide a basis for legitimate claims upon the social responsibilities of those social groups that have benefited most from the Celtic Tiger.

⁶ This paper has focused on the collective contribution of the national system of innovation to success through industrial upgrading but we might also consider, among others, the contributions of welfare state institutions and household labour to social reproduction, and of social partnership institutions to collective problem solving and infrastructure development.

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